

WHAT IS CLAIMED IS:

1. A liquid-crystal display device comprising:
a transmission type liquid-crystal display panel
including a liquid-crystal cell;

5 a light source disposed on at least one side surface of
said liquid-crystal display panel; and

an optical path changing sheet disposed on a back side
opposite to a visual side of said liquid-crystal display panel
and having optical path changing slopes by which incident light
10 from said light source is reflected toward said visual side
of said liquid-crystal display device.

2. A liquid-crystal display device according to claim
1, wherein said liquid-crystal display panel further includes
15 a polarizer disposed on one or each side of said liquid-crystal
cell.

3. A liquid-crystal display device according to claim
2, wherein said liquid-crystal display panel further includes
20 at least one retarder disposed between said liquid-crystal cell
and said polarizer.

4. A liquid-crystal display device according to claim
1, wherein said liquid-crystal display panel further includes
25 cell substrates for supporting said liquid-crystal cell, said

cell substrates being made of an optically isotropic material.

5. A liquid-crystal display device according to claim 4, wherein said optical path changing sheet has optical path changing slopes each inclined at an inclination angle in a range of from 35 to 48 degrees with respect to a sheet plane, said optical path changing sheet is bonded to said liquid-crystal display panel through an adhesive layer so that a slope-forming surface of said optical path changing sheet is located on said back side opposite to said visual side of said liquid-crystal display panel, and a refractive index difference is not larger than 0.15 between said optical path changing sheet and one of said cell substrates nearest to said optical path changing sheet.

6. A liquid-crystal display device according to claim 5, wherein the refractive index difference is not larger than 0.10 is between said optical path changing sheet and said nearest liquid-crystal cell substrate, and a refractive index difference is not larger than 0.15 between said adhesive layer and said nearest liquid-crystal cell substrate.

7. A liquid-crystal display device according to claim 1, wherein said optical path changing sheet includes repetitive prismatic structures having optical path changing slopes facing said light source at an inclination angle of from 35 to 48 degrees

with respect to said sheet plane.

8. A liquid-crystal display device according to claim 7, wherein said inclination angle of said optical path changing slopes of said optical path changing sheet facing said light source is in a range of from 38 to 45 degrees with respect to said sheet plane.

9. A liquid-crystal display device according to claim 7, wherein each of said prismatic structures of said optical path changing sheet is constituted by a concave portion shaped like a triangle in section.

10. A liquid-crystal display device according to claim 9, wherein said prismatic concave portions are constituted by continuous grooves extended from one end of said sheet to the other end of said sheet in a ridgeline direction parallel to or inclined to a side surface of said liquid-crystal display panel on which said light source is disposed.

11. A liquid-crystal display device according to claim 7, wherein said prismatic concave portions are constituted by discontinuous grooves each of which has a length of not smaller than five times as large as the depth of said groove and in which a direction of a length of said groove is substantially

parallel to a side surface of said liquid-crystal display panel on which said light source is disposed.

12. A liquid-crystal display device according to claim 5 7, wherein each of said prismatic structures of said optical path changing sheet is constituted by a concave or convex portion shaped like a rectangle in section and having two or more optical path changing slopes facing said light source.

10 13. A liquid-crystal display device according to claim 1, further comprising a reflection layer disposed on a back side opposite to a visual side of said optical path changing sheet.

15 14. A liquid-crystal display device according to claim 13, wherein said reflection layer adheres closely to a surface of said optical path changing sheet on which said optical path changing slopes are formed.